

# Assessing the Accuracy of our Seawater Temperature at the Surface and Dissolved Oxygen Data



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## Introduction

The ocean plays a crucial role in regulating global climate systems and supporting marine ecosystems. Monitoring key parameters such as Seawater Temperature and Dissolved Oxygen levels essential for understanding changes in oceanic biodiversity and their impacts on marine life. By evaluating these measurements, we aim to enhance our understanding about marine ecosystems.

As we were learning about ocean in MIRAIE, we have collected Seawater Temperature at the surface and Dissolved Oxygen data from Mikawa Bay To Philippine Sea. By our seven days of data collecting experience we have gathered Seawater Temperature at the surface and Dissolved Oxygen. We learned how this data can affect ocean and people.

## Question

Is the seawater temperature at the surface and dissolved oxygen data reliable?

## Hypothesis

We think most of the data are accurate. Some data maybe inaccurate because if we leave our seawater(data) inside the bucket for extremely long time, Dissolved Oxygen can get out from seawater. If Dissolved Oxygen gets out from the seawater, it can make our data different from the reality.



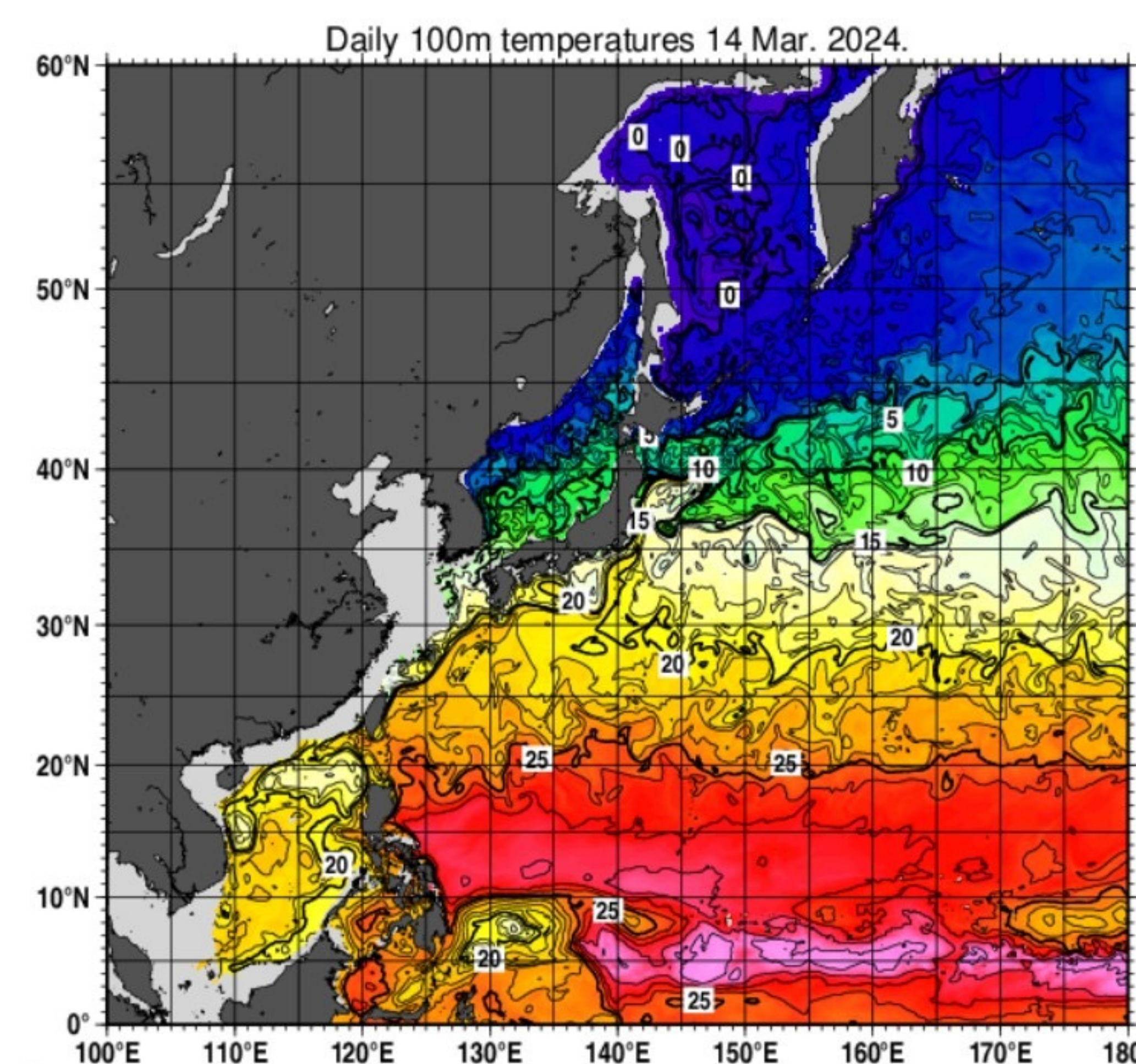
This is tall ship MIRAIE on the way to Palau from Yokohama Port, Japan.

Illustration by our instructor Ms. Christina Buffington

## Methods

- In order to collect Dissolved Oxygen data. We collected the data by using bucket with rope. Then we used the probe that can measure the amount of Dissolved Oxygen. In order to use it, we had to calibrate it.
- We used bucket to collect Seawater Temperature at the surface. Then I used the Vernier Temperature Probe which was proved that it is accurate when it was put into ice to measure the temperature.
- We chose a representative from 7 average daily 100m temperature maps.
- We used the GLOBE table showing the expected Dissolved Oxygen in salt water at sea level (1013.25mB) with temperature and salinity from Quality Control Procedure for Dissolved Oxygen Kit.

Average Seawater Temperature map



We compared our data to this map which shows average daily 100m seawater temperature between Mikawa Bay, Japan and Philippine Sea.

Source: Met Office of Japan, 2024

## Results

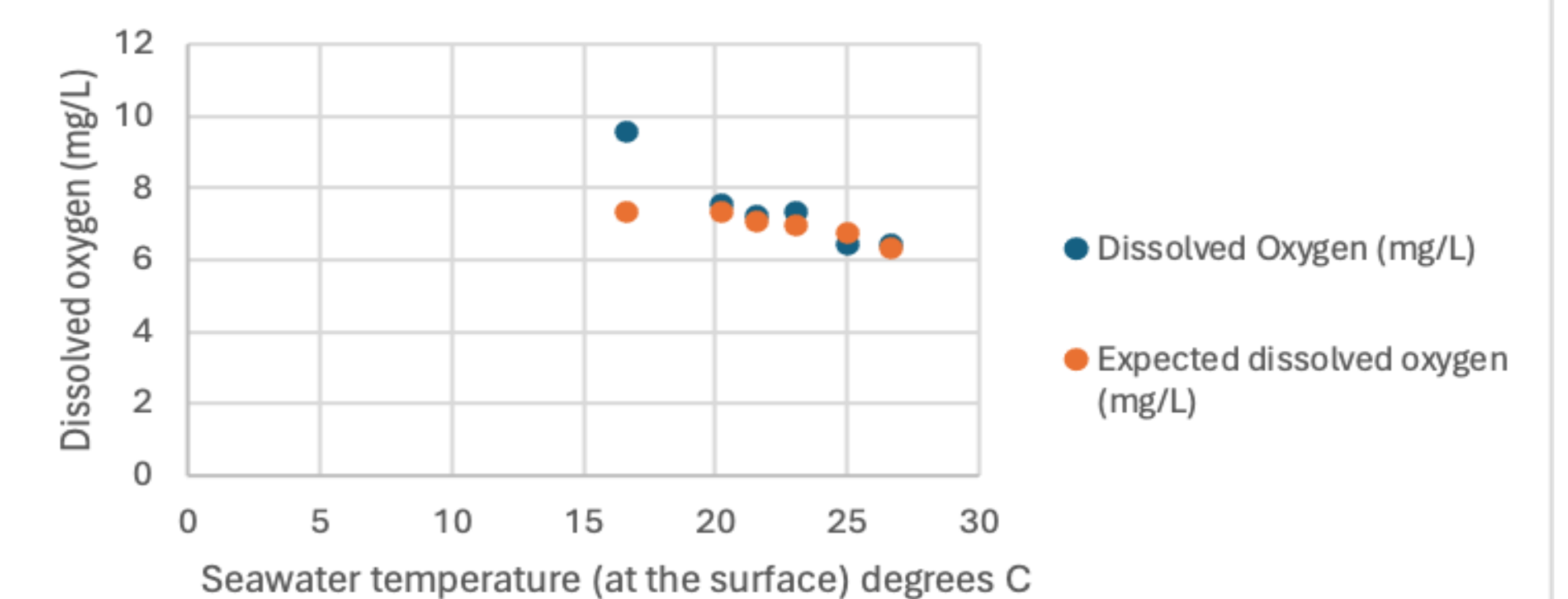
Date	Start Time	Seawater Temperature at the Surface (degrees Celcius)	Dissolved Oxygen (mg/L)	Expected dissolved oxygen (mg/L)	Start Lat	Start Long
13-Mar	13:00	8.8			34°43.916'N	137°08.886'E
14-Mar	13:22	16.6	9.6	7.4	33°59.497'N	136°58.816 E
15-Mar	9:11	23	7.4	7	31°29.430N	136°37.241
16-Mar	10:39	20.2	7.6	7.4	27°59.706N	136°26.515E
17-Mar	10:44	21.5	7.3	7.1	24°59.929N	136°16.943E
18-Mar	10:18	25	6.5	6.8	22°07.209 N	136°04.931E
19-Mar	10:36	26.6	6.5	6.4	135°56.045'E	135°56.045'E

## Discussion and Conclusions

As we compared our seawater temperature at the surface to the map of seawater temperature, we noticed that our data was accurate and reliable. Also our Dissolved Oxygen data was similar to the expectations.

We also noticed that as Seawater Temperature rises the amount of Dissolved Oxygen decreases. We learned this is because when the temperature rises, the molecules of seawater move faster, which makes Dissolved Oxygen diffuse of the water.

Seawater Temperature and Dissolved Oxygen between Mikawa Bay and Philippine Sea



## Next Steps

1. As we were learning about sea temperature rising in MIRAIE, we started to wonder about the difference of Seawater Temperature between ancient times and now, so that we can know how humans affected on Seawater Temperature.
2. We hope our expertise will help us to enhance our thinking capability, and by this expertise we wish to broaden our expertise in wide range of marine area.

## Acknowledgements

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